THE COLLEGE.

REPORT OF THE PRINCIPAL TO THE BOARD OF TRUSTEES FOR YEAR ENDING APRIL 29, 1896.

NUMBER OF STUDENTS.

No. of Undergraduates in Arts (attending)	265
" " " Extra-mural	85
General Students in Arts	46
Post-Graduate Students in Arts	14
Undergraduates in Law	4
" Practical Science	6
" Theology	40
" Medicine	132
Total	592

Or, allowing for double registrations, 564 ; as compared with 432 in 1892-3, 456 in 1893-4, and 533 in 1894-5. Our increase last year was chiefly in extra-mural students. This class which has risen from 38, three years ago, to 85 this year, consists chiefly of teachers, who—unable to attend lectures—are prosecuting their studies at home, often with great earnestness and success. The Professors do what they can for them by means of correspondence ; but it is felt that more systematic assistance would be given, if tutors were employed to send them notes of the lectures and to correct their exercises and essays. It is also proposed that special examinations should be held for them during the Easter holidays. If these changes are made, the present fee of $10 would have to be largely increased ; but that ought not to be a serious objection, as the extra-mural student is exempt from all the charges of attending classes. The matter is engaging the attention of a Committee of the Senate.

DEGREES CONFERRED.

In Medicine, M.D., C.M.	19
In Theology (4 Testamurs and 2 B.D.s)	6
In Law (LL.B.)	4
In Arts (33 B.A. ; 17 M.A. ; 1 D.Sc.)	51
	80

In addition to these, six honorary degrees were conferred ; in Divinity, on the Rev. Angus McColl, Chatham, Ont., and on the Rev. Wm. P. Begg, Kentville, N.S. ; and for professional and scientific distinction, the degree of LL.D. was granted to Professor John Fletcher, M.A., Wm. Saunders, F.R.S.C., James Fletcher, F.L.S , Dominion Entomologist, and A. T. Drummond, LL.B., Montreal.

LOSSES DURING THE SESSION.

At the opening of the Session, the Venerable Vice-Principal Dr. Williamson was taken from us, after fifty-three years of continuous service. The students have testified their regard for the beloved

Professor by erecting a mural tablet of brass in his memory in Convocation Hall; and it has been decided to appeal for $5,000 to the graduates and others who valued him, to endow scholarships bearing his name with the money. In life, it was his delight to aid students. It is most fitting that he should continue to do so after death. Contributions to the fund should be sent to the Treasurer, J. B. McIver, Kingston.

Shortly after the New Year, death struck Dr. K. N. Fenwick and then Dr. H. Saunders, men in the prime of life, and whose places cannot be adequately filled. Here again the students have shown their regard for their Professors by presenting beautiful portraits of them, to be hung in Convocation Hall, painted by Mr. Ernest Lawson of Toronto. Friends of the late Hon. W. Morris, the first Chairman of the Board of Trustees, have also presented us with his portrait, painted by the same artist.

We have to record the loss of two Trustees, who as long as their health permitted—were never absent from the meetings of the Board, the Rev. Dr. Laidlaw, of Hamilton, and the Rev. D. J. Macdonnell, B.D., of Toronto. While we shall miss both, it is not too much to say that the loss of Mr. Macdonnell is irreparable.

Failing health has compelled Mr. John Cormack to resign the position which he filled with a perfect heart for so many years. In retiring, he takes with him the respect of every one who knew him; of students, Professors and Trustees.

Other losses, of promising students and kind benefactors, help to make the past year a sad one. Of the former, I would specially mention Mr. James D. Stewart, M.A., and of the latter Mr. Robert Anderson of Montreal, who for many years gave $100 in scholarships to the Theology Faculty. He has left the University a legacy which will continue those scholarships, at least in part.

THE FACULTY OF PRACTICAL SCIENCE.

The Dean's report, which is appended, gives all the information necessary concerning this new department. Workshops are recommended by him, and it is proposed to build, in connection with them, baths for the football players, and a gymnasium for the students generally. Three thousand dollars are needed for these purposes, and it is hoped that the graduates who have often advocated while students these necessary additions, will assist in their erection.

MEDICAL FACULTY.

The work of the session was opened in the beautiful new Operating Theatre, towards the erection of which the late Dr. K. N. Fenwick contributed $2,500, and his colleagues in the Faculty $500 additional. In Pathology and Bacteriology, Professor W. T. Connell has organized a special Laboratory, and an additional Laboratory in Chemistry has been equipped. In these important departments, as well as in every department of Biology, Botany, Animal Biology, Physiology and Histology, apparatus is of the most modern kind, and we have Professors giving their whole time to the subjects they teach. The attention of our medical graduates is called to this; and I trust that they will feel the responsibility of aiding in the further development of these branches of science in which they are professionally interested.

A beginning has been made in the work of forming a modern Medical Library open to the students. A steady revenue is secured for it by imposing on each student a small annual fee, and Dr. Herald, the Secretary of the Faculty, discharges the duty of Librarian gratuitously.

FACULTY OF THEOLOGY.

Mr. Hugh Waddell, Peterborough, has not waited for the fulfilment of the condition on which he promised $5,000. He has subscribed the amount, and is paying interest on it, and I would recommend that this be set apart for a "Hugh Waddell Lectureship in Church History" until the whole amount needed for a Chair has been secured, and that Professor Macnaughton be appointed Lecturer for the ensuing session. During the past session Professor Macnaughton gave a course of lectures which the students appreciated very highly.

The Conference of the Theological Alumni, held last February, was most successful. A special feature of it was a course of lectures on "The New Life in Christ" by the Rev. Dr. Wm. P. Begg. The programme for next February is herewith appended. It will be noticed that many of our Alumni prepare the papers that are discussed. This is a cheering feature which shows that one of the chief objects contemplated when the Conferences were first proposed has been largely attained, The Chancellor has kindly promised to continue his Lectureship.

PROGRAMME BEGINNING FEB. 8TH.

Forenoons.

I. The Chancellor's Lectureship. Professor Watson will lecture daily on "Christianity in its Relations to Human Progress."

II. Biblical Theology. Rev. D. Strachan (Hespeler) will read a paper on "The Conception of God by Amos."

Rev. J. Mutch (Toronto), on "The Conception of God by Hosea."

Rev. R. J. Hutcheon (Toronto), on "The Conception of God by Micah."

Rev. G. M. Milligan (Toronto), on "The Conception of God by Isaiah."

N.B.—See Robertson Smith's "Prophets of Israel."

III. Problems of the Pastorate. Discussions presided over by Rev. Dr. Thompson (Sarnia). Papers by Rev. J. A. Grant (Richmond Hill), Rev. S. Childerhose (Parry Sound), Rev. D. G. McPhail (Picton).

Afternoons.

I. Influence of Imperial Rome on Christianity. Rev. J. A. Sinclair (Spencerville).

II. The Present Position of the Old Testament Historical Criticism. Professor Mowat.

III. The Development of National Character in Canada and the United States. Rev. S. Bland (Cornwall).

IV. Church History. (The First Century). Three lectures by Professor Macnaughton.

V. Interpretation of Modern Life by Modern Poets. Three lectures by Professor Cappon.

VI. Interpretation of Tolstoi. Professor Dyde.

Tolstoi's View of History, as seen in " War and Peace," by Rev. John Hay (Cobourg).

Tolstoi's View of Life, " Life" and " Anna Karenina," Rev. T. J. Thompson (Belleville).

Tolstoi's Religious Views, "My Confession" and "My Religion." Rev. A. Laird (Port Hope).

VII. Some New Testament Problems. Professor Ross.

Evenings.

Social and Economic Discussions. Presided over by Professor Watson and Shortt.

(*a*) Kidd's View of Modern Socialism. Paper by Rev. Mr. Binnie (McDonald's Corners) on Kidd's Social Evolution.

(*b*) Caird's Conception of Christianity. Papers on Caird's Evolution of Religion. Rev. J. G. Stuart (London) and Rev. J. Miller (Norwich).

(*a*) Economic Meaning and Function of Labor, Wealth, Capital Money. Rev. W. W. Peck (Napanee).

(*b*) Economic Development of the Condition of Labor in England. Rev. W. A. Hunter (Toronto).

(*c*) Economic Development of the Condition of Labor in Canada. Professor Shortt.

(*d*) Trusts, Combines, and Monopolies. Rev. J. J. Wright (Lyn).

(*e*) The Municipal Problem. Rev. D. C. Hossack (Parkdale).

(*f*) The State in Relation to Crime. G. M. Macdonnell (Kingston).

BENEFACTIONS.

Besides the legacy of Mr. Robert Anderson, Montreal, and special donations from Mr. Pluman, Paris, Mr. Hugh Maclennan, Montreal, and contributions from various friends to make up a loss incurred by the Treasurer of the Bursary Fund, there is nothing to report under this head except the subscriptions received by the General Secretary. According to his report, these amount to $6,800, in addition to the $5,000, already mentioned as subscribed by Mr. Hugh Waddell.

SUMMER SCHOOL OF SCIENCE.

The School of Mining and Agriculture has, for two years past, held a summer session, for assisting teachers and others in taking a University Course in Arts. The governors, finding that it did not attract public school teachers, have resolved to discontinue it; but being convinced that it is well calculated to assist a deserving class of High School teachers, I have arranged with the Professors of Botany and Animal Biology to continue it this year, at a nominal expense to the University. For the sessions of 1896, the subjects taught will have reference mainly to the practical part of the Specialists' Examinations in Botany and Animal Biology. Classes will begin on July 7th, and persons proposing to attend should apply to W. Mason, Bursar. The School of Mining and Agriculture has added a full course in Veterinary Science to its list of departments, and the Ontario Government is now responsible for its Dairy School.

CONCLUSION.

I submit herewith the Reports of the Treasurer, of the Dean of the Faculty of Practical Science, of the Librarian, of the Curator of the Museum, and of the Professors of Botany, of Physics, and of Animal Biology.

G. M. GRANT, *Principal.*

Statement of Revenue and Expenditure of Queen's College, Kingston, for year ending April 2nd, 1896.

REVENUE.

Temporalities Board		$ 2,000 00
The Professors, Beneficiaries of Temporalities Board		1,050 00
Kingston Observatory, Grant from Government		500 00
Rent of Drill Shed		750 00
Rent of Carruthers Hall		1,250 00
Rent of Grounds		120 00
Chancellor's Lectureship		250 00
Fees, Class and Graduation	$ 4,882 39	
Fees for Examinations, Library, &c.	3,814 41	
		8,696 80
Interest on Mortgages and other Securities		17,418 23
General Assembly's College Fund:		
Church Agents, Balance 1894-5	339 00	
" " on Account of 1895-6	1,537 69	
Congregations contributing directly	1,100 25	
		2,976 94
Receipts for Scholarships		2,572 34
Interest on Jubilee Fund Subscriptions		5,067 67
Balance Deficiency		9,015 14
		$ 51,667 12

EXPENDITURE.

Deficiency, 1894-5	$ 12,734 06
Salaries—Professors and Lecturers in Theology, 9 mos.	5,750 00
" Professors and Tutors in Arts	18,861 50
" Other Officers for year	4,362 64
Chancellor's Lectureship	250 00
Furniture	132 00
Insurance	326 52
Expended on Examinations, Library, Laboratories, Museum, &c.	4,060 79
Expended on Practical Science Department	422 54

Taxes, Repairs and Grounds	$ 544 69
Scholarship Account	2,572 34
Travelling Expenses	33 75
Advertising, Printing and Stationery	861 45
Fuel, Water and Gas	609 71
Contingencies	145 13
	$51,667 12

QUEEN'S COLLEGE, KINGSTON, 25th April, 1896.

J. B. McIVER,
Treasurer.

Examined and found correct.

J. E. CLARK,
D. CALLAGHAN, } *Auditors.*

REPORT ON PRACTICAL SCIENCE FACULTY, 1896.

To the Board of Trustees of Queen's University:

GENTLEMEN,—I beg to present the following report of the progress and condition of the Practical Science Faculty.

The teaching power and facilities, and the amount of accommodation available are the same as they were at the last annual report.

The number of students registered in all the Practical Science courses is eleven, but some of these are registered in Arts and some only in the books of the School of Mining.

Five students have been doing work and receiving instruction in the mechanical workshop. Four of these were engaged in mechanical work during the whole session, and the fifth left about Christmas to engage in an electrical manufacturing establishment.

The work of these four has added something to our stock of mechanical appliances without drawing directly upon the finances of the University.

Apart from the chemical laboratories, used mostly by chemical and mining students, the principal items of expense connected with the courses are those which belong to the mechanical department where lathes and tools of various kinds have to be continually used and kept in order, and material has to be purchased.

I herewith, accordingly, present a statement of what may be called the receipts and expenditure of this department, remembering that useful articles made in the workshops are to be credited as receipts to the extent of their actual value. The expenditure is as follows:—

Paid for Lathe Instructor	$ 49 50
" Material	25 35
" Planings, etc	8 40
Total	$ 83 25

RECEIPTS.

Gear Cutter for Wood and Brass	25 00
Five Pieces, Models of Beam-Scarfing	2 50
Two 42 in. Lathes with planed Iron Beds, for wood turning, $30 each	60 00

Fall Plate for Barnes Lathe	$ 2 50
Centre Rest " "	2 50
Model of Bridge, ½ Scale	2 50
Centrifugal Separator for Prof. Knight	6 00
Making changes in Chronograph for Prof. Knight	1 00
Making Apparatus for Prof. Millar	1 50
Carpenter's Bench complete	10 00
Total	$ 113 50
Leaving balance in favor of the workshop of	30 25

In the next session I propose to make several other pieces of useful apparatus, *i.e.* useful for either practical work or for illustration; and to keep on in this line until we are furnished with all the means of doing fine and accurate work. For my firm belief is that a student will always do the best work, and put himself most fully into his work, when he has some practical or interesting product in view.

I was fortunate in getting a good active mechanic as lathe instructor. He gave attendance for three half-days per week, but owing to the insufficiency of our accommodations these half-days were often not more than about three hours.

The lathe instructor, of course, relieved me from a considerable amount of care, but this did not much decrease the real amount of work which I found it necessary to do. For all the planning and designing, and overlooking the carrying out of these designs, still devolved upon me, and I do not see how it could well be otherwise. The consequence was that about twelve hours a week of my time were given to the mechanical department, and by far the greater portion of that was spent in the workshop.

Besides this I agreed to lecture upon the subject of mechanism. This I faithfully carried out, lecturing upon the subject one hour per week throughout the session. But I found it necessary, for the students' sake, to give an extra course of lectures upon the construction, use, and adjustments of mathematical instruments. And owing to the death of our lamented friend, Dr. Williamson, I had, in the best way I could, under the circumstances, to take up the subjects of the mathematical course which had hitherto devolved upon him; for although in his latter years he did not do much, yet that little became a necessity for some one else as soon as he had passed away.

I had hoped to be able to give some time to doing independent work in my own subject of mathematics, but, in the ways mentioned my time is so completely occupied from morning to night, that the hope appears now to be a forlorn one.

Our present workshop does not give sufficient accommodation, and I would press upon the consideration of the Board, the advisability and necessity of better accommodation.

The practice of carrying on iron work and wood work in the same shop is objectionable from many points of view, which I need not specify; but particularly as the number of students increase we must have the means of carrying on the work during both the forenoon and the afternoon hours.

As soon as possible the Department should be supplied with a competent Professor of Engineering, a man of a wide range of knowledge.

Professor Harris has been extremely obliging and deserves the special thanks of your Board for his kindness in giving his service free for the past two sessions. But his time is already very much occupied, so that he is not able to give more than two or three hours a week to the work here. We need a man who can give his whole time to overtake the work that is to be done.

For such subjects as Descriptive Geometry, strength of materials, subject of strains and stresses, theory and practice of surveying, theory of the steam engine, of the gas engine, the caloric engine, the dynamo and the motor, the various steam-powers, the general practice of engineering, civil, electrical, mechanical; mining, etc., will occupy about all the available time of a single professor, if indeed it does not prove too much for one.

I will make the best arrangements that I can for next winter, but I trust that some permanent one may be arrived at in the near future.

N. F. Dupuis,
Dean of Science Faculty.

THE LIBRARY.

To the Chancellor and Board of Trustees of Queen's University:

Gentlemen,—I beg to submit for your consideration the following report with regard to the College Library. Large as was the number of volumes added to the Library during the previous year, the number added during the past year has been even larger. The following is a tabulated list:

Purchase	1012
From Dr. Williamson's Library	263
Estate of the late Sheriff Theodwell	136
Other Donations	352
Bound Periodicals and Pamphlets	96
Total number of volumes	1859

ABSTRACT OF FINANCIAL STATEMENT PROM AUDITORS' REPORT.

Total Receipts	$1,687 88
Expenditure	2,226 21
Deficit	$ 538 33

This deficit was due to two courses:—First, several accounts for books purchased during the summer had to be paid sooner than usual, thus throwing them into last year's audit; secondly, the book binding account of last summer was much larger than usual owing to the binding up of a number of reports which had been accumulating for some time. To meet these accounts, after paying out my own cash on hand, I borrowed $326 from the examination fund through Dr. Bell, of which $200 has since been returned.

In accordance with the wishes of the Trustees I undertook the preparation of a card catalogue of the Library, including both authors and subjects. Before doing so I visited the Library of Harvard University and the Public Libraries of Boston, Cambridge, Toronto and Hamilton where card catalogues are in use. Though rather alarmed at first by the estimates given of the cost of such an undertaking, yet, dispensing with experts and being fortunate in securing quite efficient assistance at very reasonable rates, avoiding patents and having the case made from my own specifications, I have managed to carry the preparations of the catalogue to a pretty advanced stage at a very modest outlay. The work consists (*a*) of the preparation of index names for the type-writer (*b*) the type-writing of the titles of the books on the cards under the index names (*c*) the alphabetical arrangement of the cards according to the index names, and the placing of them in the drawers of the case. The case is made to hold 84,000 cards. Up to the present 23,000 cards have been printed, and about 15,000 placed in the case. I estimate that another 20,000 cards will fairly well complete the cataloguing of the books now in the Library, including the more important articles in the higher grade periodicals. This will require at least $100 for type-writing, $50 for cards, and $50 for assistance in preparing the index names and arranging the cards.

The influence of the new catalogue is already quite marked. Though opened in November and only partially completed, yet, since January, from 550 to 600 vols. per month have been consulted, which is nearly double the past record, while, owing to the additional classification by subjects, the range of books used has been greatly enlarged.

Some idea of the growth of the Library and the expansion of its usefulness may gathered from the following particulars. During my fist year as Librarian, 1889-90, the total number of books added to the Library was 473 vols., and the number of library checks taken out by the students was about 90. During each of the last two years we have added over 1800 vols., and although in the meantime special sets of books have been placed in some of the class rooms and also in the general consulting room, yet the number of checks taken out this session has been nearly 300.

Appended is a statement of the expenditure in connection with the catalogue up to the present.

Expenditure connected with the preparation of the Card Catalogue.

Received from the Treasurer		$ 300 00
R. J. Clark, Cataloguing the Bell Collection	$ 11 25	
Library Bureau. Cards 21,500	64 40	
Duty on Cards	21 05	
Freight on Cards	1 51	
Express on Type-writer	1 20	
W. W. Peck, Assistance with Catalogue	50 00	
Miss S. Gibson, Type-writing	122 50	
J. S. Shortt, Assistance with Catalogue	25 00	
		296 91
Balance on hand		$ 3 09

ADAM SHORTT, *Librarian.*

THE MUSEUM.

The Curator of the Museum begs leave to report that a collection of 77 specimens of Rocks and Minerals was lately received from the Geological Museum at Ottawa, also a small collection from Mr. James McCaig. Some interesting articles were received from Dr. George J. Neish, Jamaica.

No additions were made to the Zoological Department during the year. I would strongly advise that Dr. Knight be appointed Curator of the Department.

A number of plants collected in the neighborhood were added to the Herbarium. No grant was made last year to meet expenses and none were incurred.

Three gallons of alcohol and five tins of mounting paper are required for the current year.

JAMES FOWLER, *Curator.*

REPORT ON BOTANY CLASSES.

During the Session the number of students registered :—

In the Junior Class	18
First Year Honours	10
Second Year Honours	7
Total	35

This Session practical work was introduced into the Junior Class for the first time, but the amount of material required will render it impossible to continue it unless larger collections of plants can be obtained.

All the students who attended the Honour Classes during the Session are teachers preparing for the position of Science specialists. With only one or two exceptions all had taught Botany in the Public Schools and were well prepared for the College studies, consequently a large amount of work was accomplished and very satisfactory progress was made.

Owing to recent advances in Botany, the study has completely changed during the past few years, and it now takes its place side by side with the other branches of the scientific education. The former idea that the examinations of the external forms and arrangements of the parts of flowering plants, for the purpose of ascertaining their names, is the sole object of Botany only lingers as a popular misconception. A Test-Book, a few flowering plants and a pocket lens are are no longer sufficient equipment for the student. The study of tissues and their functions, leading to a knowledge of the laws and conditions of life, opens up new views of nature and guides to important practical results. The morphological work necessary for beginners now receives a good deal of attention in the High Schools and Collegiate Institutes, and students are prepared when entering College to devote a larger portion of their time to Histology, Physiology and Cryptogamic Botany.

At the opening of the Session I introduced Vines' "Student's Text-Book of Botany" for the second year Honour Class,—a work of a much higher and intellectual character than any other Text-Book at present available. It deals with the vegetation of the globe, and makes large demands upon the intellectual powers of the students. For its successful study, a much larger Herbarium and a fuller equipment are necessary than we at present possess. Its numerous illustrations and examples are principally taken from European plants and cryptogams, and good collections of these are necessary for our future work.

WE NEED FOR NEXT SESSION.

1. Collections of our common plants. Allowing each student one plant a day (in Honour Classes they require more) for analysis, the number necessary for the Session is greater than our present supply can furnish. In previous years I have made collections, devoting a part of the summer vacation to the work. Last year I spent some time at Jones' Falls and secured a goodly number of specimens, besides collecting in Kingston, but I cannot supply the demand for another Session.

2. The Honour Classes require collections of Grasses and Cryptogamous plants. A few years ago I collected a large number of specimens between Kingston and the Ottawa River, but the supply now on hand, with the exception of the Mosses, is utterly insufficient for another Session. Mr. A. T. Drummond very kindly presented the Herbarium with a collection of mounted Algae and Lichens last year, but these cannot be used for dissection in class-work. I have asked the students, both in class and individually, to make collections for next winter's work, and perhaps we may obtain a supply from this source. In the U.S. excursion parties of students are formed to accompany a Professor to some selected region and spend a few weeks in collecting material for winter use.

3. The Herbarium must be increased for the benefit of the second year Honour Class. For a few years I endeavoured to give instruction on the Geographical distribution of plants, and also on economic Botany, but owing to the want of material was compelled to abandon this part of the work, though the subjects are very important both in a theoretical and practical point of view. We have a good collection of Ontario plants, also a large number from other parts of the Dominion and from the U.S. But a large part of our Text-Book is unintelligible to students without a good collection of European plants as type specimens. In the present condition of Botanical science no College can afford to confine the attention of its students to the plants of their own neighborhood. I intend visiting Oxford and Cambridge, and perhaps Germany, for the purpose of learning the methods of teaching now adopted there; and I have employed all my spare time for the last two months in selecting specimens from our duplicates, and making up bundles for exchange with European Botanists, hoping to supply some of our wants.

In my last report a request was made for a grant to procure jars and alcohol to preserve specimens in their natural forms, and so give the student a clear idea of the actual form and appearance of the species in its living state, and save the dried specimens from destruction. Properly prepared specimens sealed up in jars would remain unchanged for many years. Five gallons of alcohol and three dozen jars would serve as a beginning.

5. Some papier mache or glass models of typical flowers and the parts of fructification are an absolute necessity for next Session. Also some microscopic preparations of the lowest forms of plants. These can be most easily obtained in France or Germany. About $150 would be required to secure them.

6. The subject of Vegetable Physiology is receiving a large amouut of attention at the present time, many Colleges make it the most prominent department in the Botanical course. We have always devoted a part of each Session to its study, but lectures and Text-Book work, without experiments, leave but a feeble impression. Last Session some pieces of apparatus were obtained and a few useful experiments made. To conduct the work properly a small conservatory, two well-lighted, well-heated rooms, and a dark room are necessary. An Instructor, in connection with the School of Agriculture, would make it valuable addition to our present course of studies.

James Fowler.

REPORT OF THE PROFESSOR OF PHYSICS.

Herewith I enclose an account of the expenditure in connection with the Physics Department for the past Session.

Mr. W. C. Baker succeeded Mr. S. A. Mitchell as Demonstrator of Experimental Physics and filled this position satisfactorily. Thirty-four students took advantage of laboratory instruction, and others would have done so if the laboratory had been open to them in the forenoons. I would suggest the appointment of a second tutor who would give instruction in forenoons and that he be paid out of the balance in my hands. As it is contemplated to build workshops for the Practical Science Faculty, the two rooms hitherto used by the Dean might be handed over to me for experimental work in light and electricity.

(Signed) D. H. Marshall,
Professor of Physics.

REPORT ON ANIMAL BIOLOGY.

The total registered attendance in this department during the past Session was 103. In the junior class in Arts 10 ; extra-murals, 5 ; in first year honors, 9 ; extra-murals, 2 ; in final honors, 6 ; extra-murals, 2. In medicine, junior animal biology, 3 ; first year physiology, 31 ; second year physiology, 38 ; histology and embryology, 34. Laboratory fees from arts students $164.00, from medical students $132.00. This money was spent partly in the purchase of laboratory supplies and apparatus, and partly in repairs and laboratory assistance. Vouchers for its expenditure will be sent to the College Treasurer.

I emphasize the fact that our subject of study is *animal life* in all its aspects. As a matter of convenience and clearness in teaching, teachers of biology sub-divide this immense subject, and examine separately the social life of animals, their intelligence, their genetic relationships, their distribution, their embryology, their anatomy and their physiology. For the same reason, biologists make a separate study of the forces which have originated, continued, or arrested the growth and development of animals in geologic and recent times. All of these aspects are discussed with honor men as fully as time will permit. But it is different in the case of medical students. They make a close study of one animal only, and study it from only one or two of these aspects. It was to correct this narrow view of life that the medical faculty consented, two sessions ago, to add the pass class in animal biology to the medical curriculum. Brief as the course is in this class, it gives the students a new view of the meaning of human anatomy and physiology. He soon discovers that human physiology is *per se* a misnomer; that if he limited his knowledge of physiology to that of human beings, he would be largely ignorant of the subject. Animal physiology—not human physiology—is what a modern medical man studies, and he learns more of it from the domestic animals than from man. On the anatomical side the student soon sees that the human body is something more than a collection of bones, muscles and nerves. He finds the same organs somewhat modified in the cat, and still more changed in a fish, and soon gets glimpses of the view that man is the historic climax of a longer line of ancestry than he had ever dreamt of.

The time seems opportune when some other phases of the study of life should be required from the student in medicine. The Medical Council will next year exact five years' study from all who desire to practise in Ontario, and while many students will naturally devote the additional year to final subjects, that is, to the various forms of disease as manifested in men, women and children, some of the more ambitious and clever students will take a wider view of disease, and desire to study it *comparatively*, or as it manifests itself in various forms in animals and plants.

The only objection that can be urged against the fifth year's course of the Medical Council is that its scope is too narrow. The regulation implies that students must attempt research work in their fifth year. Now, the truth is that very few medical students are, at graduation, fit to do research work in either physiology or pathology. The foundations for such work must be broadly laid. By this I mean that a man is best qualified to do research work in medicine who has acquired a wide knowledge of animal and plant biology, who knows anatomy, physiology and embryology comparatively, and not in the limited way learned by the average medical student. If this is so, then the attempt to induce raw graduates to devote themselves for six months to research work is a mistake. The time has long gone by in any science when the mere beginner can hope to make any considerable addition to the sum of human knowledge. Infinitely better to teach him to be modest and reverential in the presence of the work done by the great masters. Research work is done now-a-days by experts—not by beginners.

In place therefore of fixing the curriculum for five years, the Council would, in my opinion, do well to allow students a choice as to how they shall spend the time. In place of apportioning two years to primary subjects and three to final, would it not be well to encourage students to lay the widest possible foundation for medicine by taking during their first three years a full honor course in biology. Students in other departments of learning are compelled to view their subjects widely. The man who devotes himself to literature now-a-days must know not only English literature, but modern literature. Not only so, but before he has spent a day in the serious study of modern literature, he discovers that its roots are all in the past—in the literature of Egypt, Palestine, Greece, Rome. To understand the present he *must* know the past. So, with the student of social and political science, of religion and of philosophy. If he wishes to understand their present-day problems and relationship, he must study them in the light of the past. And the same thing is true in biology : a student who limits his knowledge of anatomy to one animal, for example, man, would be like a litterateur who limited his studies to Browning or a philosopher who limited himself to Spencer or Caird.

From the crown of the head to the sole of the foot we bear upon us indisputable evidence of our relationship to the past, and of our ascent from the lower animals. If we wish therefore to lay a broad and solid foundation for the future life-work of our graduates in medicine, we can do it only by encouraging them by every means in our power to devote the additional session chiefly to practical work in comparative anatomy and embryology. How wonderfully these subjects illumine medicine can be seen by opening a modern test-book. Not merely is it impossible to understand such normal structures as the aortic arch, the appendix, the musculature, and the hundred other puzzles of the earlier anatomists, but many abnormal structures and malformations are absolutely inexplicable apart from the results of modern embryology and morphology. Cleft palate and harelip are perhaps intelligible apart from the doctrine of evolution, but the existence of openings on each side of the neck, or of tumors marking the site of such primitive openings, are not so easily explained. We meet also with openings on the throat or abdomen, on the head and back, with malformations of the heart, blood vessels and other organs of the body, which cannot be understood apart from the theory of the descent of man, or from the light which embryology sheds upon their dismal existence. Vestiges of the fearful and wonderful creation of man meet the surgeon at every turn. A cloaca in one man, or a right aortic arch in another give proof of his relationship to birds, gill slits tell of his affinity to fish, whilst communicating ventricles shew that in his heart at least, he is little better than a reptile.

The first winter I was on the staff, a practising surgeon sent to the laboratory for diagnosis what he called a small tumor. He gave no history of the specimen except that he had removed it from the tongue of a boy. On examination it proved to be a cartilaginous tooth, and was evidently one of those growths, abnormal in the human being, but perfectly normal in some of the lower animals, (fish) in the same situation. In the same way, a growth of hair is sometimes found on the inside of the cheeks of children. This again is of course quite unusual, but when we examine the cheeks of rabbits, hares and porcupines we find analogous growths. All such structures are puzzling to the physician, simply because he fails to connect them with the past. Similar puzzles meet all investigators. For example, finding no farms owned by farmers on Amherst Island is puzzling. Finding no farms that have been regularly surveyed and planned in Longueuil Township, in the County of Prescott, is equally puzzling. But a brief reference to the past solves both difficulties. Amherst Island was, years ago, granted to an Irish landlord who decided to manage it like an Irish estate. Longueuil township was part of a French seigniory, and it is therefore to-day indissolubly connected with the French occupation of Upper Canada. And in the same way, the vestigial structures which were so puzzling to the earlier anatomists, and the congenital malformations which are so inexplicable to the half-educated surgeon of to-day, become luminous to the man who has read modern biology.

I have been led to make these observations in the hope that some of our graduates may be induced to consider this matter more fully than they have hitherto done, and may use their influence in having the Medical Council so legislate as to lay a broad and generous foundation for medical education, rather than attempt to embellish a flimsy structure with tawdry ornamentation in the name of research work. How disjointed is the framework of our medical curriculum was forcibly brought to my mind by examining recently, Coats' Manual of Pathology, edition of 1895. A hurried reading shewed me that about 250 pages, were taken up in discussing matter that belongs properly to biology. The author is hardly to blame. The ollapodrida of embryology, morphology and pathology which he has compressed into a single volume of 1100 pages is the faith of the medical curriculum, not his. It had its origin in an evident desire to make medical students, at the *end* of their course, familiar with subjects which they should have mastered in their first or second years, and apart from the incongruity of the matter the book is doubtless a very able work on pathology. But if such a course of medical study is defensible, then one in arts which would invert all our present courses would be equally defensible.

I have again to express my indebtedness to Professor Dupuis for making a very efficient centrifuge machine, and for repairs and alterations made in some of my apparatus. To Dr. Goodwin of the School of Mining I am indebted for donations of chemicals, and for the use of apparatus. Mr. Campbell, a student from Manitoba, gave us the skull of a beaver.

The demonstrator for the past session, Mr. Wm. Moffatt, M.A., has done his work satisfactorily, and is willing to do similar work next session if re-appointed. He spent an hour a day demonstrating to the class of practical anatomy with honor men in Arts, and during the last three weeks of the session reviewed the first year physiology with medical students.

As regards our more immediate and pressing wants I beg to submit the following :—

1. That half-a-dozen more, strong but inexpensive microscopes be procured for the use of first-year students ; cost, about $100.00.

2. That a dust-tight case be procured in which to place the physiological instruments now belonging to my department. I was authorized to get the case last year, but the money was used in buying additional apparatus, and I have had to pay the penalty by caring for my instruments at considerable personal inconvenience.

A. P. Knight,
The John Roberts Professor of Animal Biology.

April 30th, 1896.

Erratum.—On page 11, lines 5 and 19, read June 20.

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